



An investigation of the mechanism underlying teacher aggression: Testing I³ theory and the General Aggression Model

Paul Montuoro^{1*} and Tim Mainhard²

¹School of Education, La Trobe University, Melbourne, Victoria, Australia

²Department of Education, Utrecht University, The Netherlands

Background. Considerable research has investigated the deleterious effects of teachers responding aggressively to students who misbehave, but the mechanism underlying this dysfunctional behaviour remains unknown.

Aims. This study investigated whether the mechanism underlying teacher aggression follows I³ theory or General Aggression Model (GAM) metatheory of human aggression. I³ theory explains exceptional, catastrophic events of human aggression, whereas the GAM explains common human aggression behaviours.

Sample. A total of 249 Australian teachers participated in this study, including 142 primary school teachers (*Mdn* [age] = 35–39 years; *Mdn* [years teaching] = 10–14 years; 84% female) and 107 secondary school teachers (*Mdn* [age] = 45–49 years; *Mdn* [years teaching] = 15–19 years; 65% female).

Methods. Participants completed four online self-report questionnaires, which assessed caregiving responsiveness, trait self-control, misbehaviour provocation, and teacher aggression.

Results. Analyses revealed that the GAM most accurately captures the mechanism underlying teacher aggression, with lower caregiving responsiveness appearing to indirectly lead to teacher aggression via higher misbehaviour provocation and lower trait self-control in serial, controlling for gender, age, years teaching, and current role (primary, secondary).

Conclusions. This study indicates that teacher aggression proceeds from ‘the person in the situation’. Specifically, lower caregiving responsiveness appears to negatively shape a teacher’s affective, cognitive, and arousal states, which influence how they perceive and interpret student misbehaviour. These internal states, in turn, appear to negatively influence appraisal and decision processes, leading to immediate appraisal and impulsive actions. These results raise the possibility that teacher aggression is a form of countertransference.

Student misbehaviour represents a common feature of many classrooms (Beaman, Wheldall, & Kemp, 2007). It interferes with the teaching and learning process (Everston & Weinstein, 2006) and represents a significant stressor for teachers (Tsouloupas, Carson, Matthews, Grawitch, & Barber, 2010). A teacher may respond aggressively to a student who misbehaves using any form of direct or passive communication intended to psychologically control them, including verbal or non-verbal attacks (Lewis & Riley, 2009; Montuoro & Lewis, 2014).

*Correspondence should be addressed to Paul Montuoro, School of Education, The College of Arts, Social Science and Commerce, La Trobe University, Bundoora, Vic. 3086, Australia (email: p.montuoro@latrobe.edu.au).

In recent decades, a handful of researchers have worked to reduce the incidence of teacher aggression in response to students who misbehave. Early on, Lortie (1975) explained that 'The teacher's exasperation must somehow be contained and his anger diffused' (p. 159). More recently, McCarthy, Lineback, and Reiser (2014) claimed that teachers who learn to reduce classroom management stress are less likely to use aggressive management practices. However, the psychological mechanism underlying teacher aggression remains unknown, and knowledge of this mechanism may be critical to reducing the incidence of this dysfunctional behaviour. Indeed, Romi, Lewis, Roache, and Riley (2011) cautioned that the mechanism underlying teacher aggression must be understood before effective interventions can be applied.

The present study investigated the mechanism underlying teacher aggression by comparing two influential aggression models: I^3 theory, which is aimed at explaining exceptional, catastrophic events of aggression (Finkel, 2014), and the General Aggression Model (GAM), which is geared towards explaining more common aggressive behaviours (Anderson & Bushman, 2002; Anderson & Carnagey, 2004; Anderson & Huesmann, 2003). I^3 theory was used to test whether the mechanism underlying teacher aggression follows a moderating pathway, whereby an instigating trigger (high misbehaviour provocation), an impelling force (low caregiving responsiveness), and a disinhibiting force (low trait self-control) spontaneously align, leading to teacher aggression. The GAM was used to test whether the mechanism follows a mediating pathway, whereby a preliminary antecedent variable (low caregiving responsiveness) increases the likelihood that a teacher will experience higher misbehaviour provocation and lower trait self-control, in turn leading to aggression. It is hoped that ultimately the identification of the mechanism will improve the effectiveness of teacher education programmes and reduce the incidence of teacher aggression.

The negative effects of teacher aggression

Teacher aggression distracts students from their work (Montuoro & Lewis, 2017; Romi *et al.*, 2011), causes embarrassment and shame (Thomas & Montgomery, 1998), damages self-perceptions (Henricsson & Rydell, 2004), and leads to peer disliking (McAuliffe, Hubbard, & Romano, 2009). Teacher aggression has also been associated with academic difficulties (Brendgen, Wanner, & Vitaro, 2006) and post-traumatic stress disorder (Hyman & Snook, 1999). It is therefore not surprising that when Thomas and Montgomery (1998) asked students, 'What rule would you like to make for the teacher to follow?' they commonly replied, 'Don't yell at us' (p. 377).

Teacher aggression also reduces student responsibility (Roache & Lewis, 2011) and leads to higher levels of misbehaviour (Mitchell & Bradshaw, 2013). In other ways, teacher aggression is directly detrimental to the aggressor. For example, it diminishes student perceptions of teacher caring (Teven, 2013), undermines the classroom social climate and teacher proximity (De Jong *et al.*, 2014), and leads to lower levels of teacher influence (Mainhard, Brekelmans, & Wubbels, 2011). The following sections introduce the central tenets of I^3 theory and the GAM.

I^3 theory

In general, I^3 theory is suited to predicting exceptional, catastrophic behaviours, such as intimate partner violence (Finkel *et al.*, 2012; Slotter *et al.*, 2012), and not common, everyday behaviours, such as counter-regulatory eating in dieters (Morton, 2014). I^3

theory asserts that human aggression follows a moderating pathway that includes instigating triggers, impelling forces, and inhibiting forces that align spontaneously (Denson, DeWall, & Finkel, 2012). Instigating triggers are focal predictors that represent exogenous social factors such as provocation, which trigger the *urge to aggress*. Impelling forces are moderators that represent dispositional factors such as trait aggression, which determine how an individual will respond to an instigating trigger. Instigation triggers and impelling forces combine to create the *overall urge to aggress*. Finally, inhibiting forces are additional moderators that represent counteractive forces that stop the overall urge to aggress from transforming into actual behaviour. When the strength of instigating triggers and impelling forces exceeds counteracting inhibiting forces, a 'perfect storm situation' is created, and the most likely result is aggression (Finkel *et al.*, 2012, p. 534).

According to I^3 theory, a teacher who is exposed to student misbehaviour will experience an overall urge to aggress if he or she has a strong instigating trigger, such as high misbehaviour provocation, as well as a strong impelling force, such as low caregiving responsiveness. But the teacher will only respond in an aggressive manner if he or she also has a weak inhibiting force, such as low trait self-control. I^3 theory therefore conceptualizes teacher aggression as resulting from an uncommon, catastrophic constellation of factors (Reason, 1990, 2000). Here, human aggression is a matter of 'the wrong person in the wrong situation' who is unable to control his or her behavioural response to this predicament (see Figure 1). If the mechanism underlying teacher aggression follows I^3 theory, it will indicate the need for teacher education programmes to target one factor in the model to halt the aggression trajectory. For example, trait self-control is easy and inexpensive to bolster in short periods of time (Denson, Capper, Oaten, Freise, & Schofield, 2011).

The General Aggression Model (GAM)

Unlike I^3 theory, the GAM frames teacher aggression in terms of personal factors that are triggered in specific situations. According to the GAM, teacher aggression can be understood as a more common behaviour. It asserts that human aggression follows a mediating pathway that begins with, and is influenced by, a distinct characteristic of the individual. The GAM asserts that human aggression begins with a preliminary antecedent variable, such as trait aggression, which leads to negative changes in internal states (i.e., mediators), including affect, arousal, and cognition, which in turn undermine appraisal and decision processes (Anderson & Bushman, 2002; Anderson & Carnagey, 2004; Anderson & Huesmann, 2003). This idea is aligned with the lifespan perspective of human aggression, which claims that some individuals are predisposed to aggression (Gustavsson, Weinryb, Göransson, Pedersen, & Åsberg, 1997).

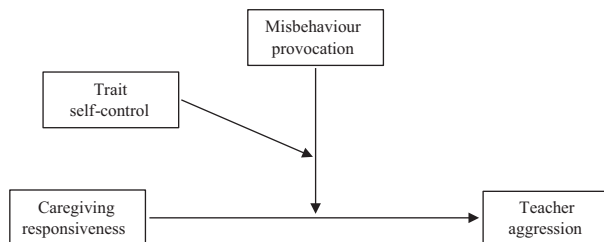


Figure 1. I^3 theory conceptual diagram.

It can therefore be said that the GAM resembles the chain reaction in a series of falling dominos (see Collins, Graham, & Flaherty, 1998). For example, a teacher with low caregiving responsiveness is more likely to experience negative changes in internal states *in response to* student misbehaviour, which in turn undermine his or her appraisal and decision processes, such as trait self-control resources, which in turn determine the teacher’s behavioural response (see Figure 2).

If the mechanism underlying teacher aggression follows the GAM, it will indicate the need for teacher education programmes to target preliminary antecedent variables such as dispositional aggressiveness, trait narcissism, and low caregiving responsiveness, because they are assumed to influence the overall aggression trajectory. This would be a challenging prospect for teacher educators because the caregiving behavioural system has been shown to be rather stable across time and situations (Bell, 2010).

The current study: Three predictors of teacher aggression

The attachment and caregiving behavioural systems

The attachment behavioural system is a goal-directed system that aims to receive care, support, and protection from ‘older and wiser others’, including attachment figures such as parents, grandparents, and romantic partners (Bowlby, 1973, 1980, 1982). The caregiving behavioural system is the complimentary system to the attachment system. It aims to ensure the survival, homoeostasis, and development of someone conceived as less able to cope on their own, including infants, children, and romantic partners (George & Solomon, 2008). In modern humans, the caregiving system is based on the influence of early attachment experiences (Bowlby, 1973; Carnelley, Pietromonaco, & Jaffe, 1996; Collins & Ford, 2010; Kunce & Shaver, 1994).

There are three main adult attachment styles, or patterns of expectations, needs, and social behaviour that result from attachment experiences (Fraley & Shaver, 2000). People with a *secure* attachment style find it easy to get close to others, and are comfortable depending on others and having others depend on them. Secure people tend to practise *sensitive and responsive caregiving* (Kunce & Shaver, 1994; Millings, Walsh, Hepper, & O’Brien, 2013). They are readily accessible to care seekers, providing a secure base from which to explore the environment and a safe haven when there is a real or perceived threat.

People with an *avoidant* attachment style prefer to be emotionally distant and self-reliant. They are uncomfortable about getting close to others and find it difficult to trust others. Avoidant people tend to practise *deactivated caregiving* (Shaver, Mikulincer, & Shemesh-Iron, 2009). They maintain what they believe is a safe distance from attachment seekers. When avoidant people are obliged to help others, they express disapproval, lack sympathy and compassion, and respond in insensitive and coercive ways.

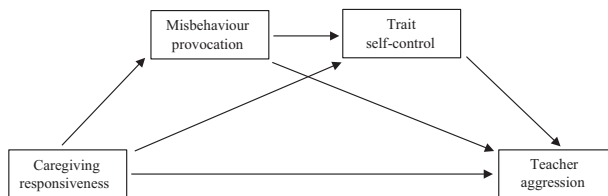


Figure 2. GAM conceptual diagram.

People with an *anxious* attachment style have a strong desire for closeness and protection. However, they also believe that others are reluctant to get too close to them and that they do not really love them. Anxious people tend to practise *hyperactivated caregiving* (Shaver *et al.*, 2009). They want to be effective caregivers, but their deficits in intra- and interpersonal skills make them vulnerable to emotional distress (Feeney & Noller, 1990; Kuncze & Shaver, 1994). Their desire for closeness also leads them to become overinvolved and coercive in their attempts to satisfy their own attachment needs.

Researchers have started to conceptualize the direction of the teacher–student relationship as caregiver dependent (see Pilotte & Pistole, 2010; Seibert & Kerns, 2009) in the same way that the direction of the psychiatric staff–patient relationship (Adshead, 1998) or the military commander–soldier relationship (Davidovitz, Mikulincer, Shaver, Izsak, & Popper, 2007) is considered to be caregiver dependent. Indeed, although caregiving evolved to increase the viability of offspring, it adapted to respond to anyone in need.

Misbehaviour provocation

Student misbehaviour has been recognized as a source of teacher frustration and provocation for almost 90 years. One of the earliest studies on student misbehaviour explained that the phenomenon ‘assails the teacher’s authority and integrity, and frustrates their teaching’ (Wickman, 1928, p. 159). A more recent large-scale quantitative study found that student misbehaviour causes teachers to experience anxiety, anger, and burnout (Koutrouba, 2013). Student misbehaviour is also the main reason why many teachers leave the profession (Brown, 1949; Buchanan, 2010; Ingersoll, 2001; Tsouloupas *et al.*, 2010).

Frustration and provocation can lead to anger, which in turn leads to aggression (Berkowitz, 1990, 1993). For example, recent research has shown that frustration and provocation commonly lead to feelings of anger, which in turn lead to approach inclinations towards perceived sources of anger (for a review, see Harmon-Jones, Peterson, & Harmon-Jones, 2010).

Trait self-control

Trait self-control refers to an individual’s capacity to consciously modify or override dominant impulses, emotions, thoughts, and automatic behavioural responses (DeLisi, 2015). ‘Quite literally it is the ability of the self to exert control over the self’ (Hagger, Wood, Stiff, & Chatzisarantis, 2010, p. 496). It is therefore not surprising that individuals with low trait self-control experience more impulse control problems (Gottfredson & Hirschi, 1990; Vohs & Baumeister, 2011), including higher levels of impulsive aggression (Finkel, DeWall, Slotter, Oaten, & Foshee, 2009).

In sum, caregiving responsiveness was assigned as the impelling force in the I³ theory model and as the preliminary antecedent variable in the GAM, because the caregiving system begins to develop in early infancy (Bowlby, 1973, 1980, 1982). The caregiving system has also been identified as an important predictor of verbal aggression (Rholes, Simpson, & Oriña, 1999; Simpson, Rholes, Oriña, & Grich, 2002).

Misbehaviour provocation and trait self-control were assigned as mediators in the GAM, supported by research showing that the caregiving system influences dispositional traits such as anger proneness (Rholes *et al.*, 1999; Simpson *et al.*, 2002) and trait self-

control (Skowron & Dendy, 2004; Tangney, Baumeister, & Boone, 2004). Here, trait self-control was entered after misbehaviour provocation because trait self-control functions as an inhibiting force in aggressive behaviour (Denson *et al.*, 2007; Giancola, 2004). Finally, in the I³ theory model, misbehaviour provocation was assigned as the instigating trigger (first moderator) and trait self-control was assigned as the inhibiting force (second moderator). This directly followed I³ theory (Finkel, 2014).

Method

Participants and procedure

A total of 259 Australian teachers participated in this online self-report study. The response rate was 49%. Ten participants were excluded from the data set because they failed to complete the questionnaires. The remaining 249 participants included 142 primary school teachers (*Mdn* [age] = 35–39 years; *Mdn* [years teaching] = 10–14 years; 84% female), and 107 secondary school teachers (*Mdn* [age] = 45–49 years; *Mdn* [years teaching] = 15–19 years; 65% female). In Australia, primary schools cater for students who are approximately 5–11 years of age, while secondary schools cater for students who are approximately 12–18 years of age. The data for this study were collected by *MyOpinions Research*, which is a market research firm based in Melbourne, Australia. The firm recruited participants from its database of Australian panel members.

Measures

After reporting their gender, age, years teaching, and teaching role (primary, secondary), the participants completed the following self-report measures.

Caregiving responsiveness

The Caregiving Questionnaire is a four-factor instrument designed to measure individual differences in the adult caregiving system (Kunce & Shaver, 1994). Four eight-item scales assess four dimensions of caregiving, including proximity, sensitivity, cooperation, and compulsive caregiving. The instrument includes 32 items that participants respond to using a 6-point Likert scale ranging from 1 (*not at all descriptive of me*) to 6 (*very descriptive of me*). This study measured the composite mean of proximity, sensitivity, and cooperation to ascertain caregiving responsiveness (for an example of caregiving responsiveness, see Millings *et al.*, 2013). The instrument had good internal consistency ($\alpha = .78$).

Trait self-control

A short form of the Trait Self-Control Scale was used in this study (Tangney *et al.*, 2004). It measures overall trait self-control, including control over thoughts, emotions, impulses, performance regulation, and habit breaking. The instrument includes 13 items that participants respond to using a 5-point Likert scale ranging from 1 (*not at all like me*) to 5 (*very much like me*). The instrument had good internal consistency ($\alpha = .79$).

Student misbehaviour provocation

The Student Misbehaviour Provocation Questionnaire was developed for the present. It is a six-item self-report instrument designed to measure teachers' tendency to feel frustrated

and provoked by student misbehaviour (see Appendix). An exploratory principal component analysis (PCA) was conducted on the six items with oblique rotation (oblimin). The Kaiser–Meyer–Olkin (KMO) measure verified the sampling adequacy of the instrument, $KMO = .84$ (all KMO values were $>.83$). Bartlett's test of sphericity, $\chi^2(15) = 810.75, p < .001$, indicated that correlations between items were sufficiently large for PCA. One component had an eigenvalue greater than 1 and explained 63.56% of the variance. The instrument had good internal consistency ($\alpha = .89$).

Teacher aggression

The Teacher Aggression Questionnaire was also developed for this study (see Table 1). It is a 12-item self-report instrument designed to measure teachers' propensity to respond to student misbehaviour in an aggressive manner. Participants respond to each item using a 6-point Likert scale ranging from 1 (*not at all descriptive of me*) to 6 (*very descriptive of me*). The instrument was designed *a priori* to measure overall teacher aggression via three subscales measuring reactive, instrumental, and passive aggression. A PCA was conducted on 12 items with oblique rotation (oblimin). The Kaiser–Meyer–Olkin (KMO) measure verified the sampling adequacy of the analysis, $KMO = .85$ (all KMO values were $>.73$). Bartlett's test of sphericity, $\chi^2(66) = 1184.70, p < .001$, indicated that correlations between items were sufficiently large. Three components had eigenvalues greater than Kaiser's value of 1 and together explained 61.56% of the variance. The scree plot was

Table 1. Summary of exploratory factor analysis results for Teacher Aggression Questionnaire ($N = 249$)

Items	Rotated factor loadings		
	Reactive aggression	Instrumental aggression	Passive aggression
I look aggressively at students when they misbehave	.908	.001	.001
I direct an aggressive posture towards students when they misbehave	.892	-.080	-.080
I speak aggressively to students when they misbehave	.764	.156	.156
I gesture aggressively at students when they misbehave	.713	-.052	-.052
I yell aggressively at students when they misbehave	.639	.214	.214
I deliberately embarrass students when they misbehave	.077	.812	-.030
I punish the whole class when only one student misbehaves or when a small handful of students misbehave	-.024	.677	-.082
I speak sarcastically to students when they misbehave	.157	.625	.098
I deliverately insult students when they misbehave	.026	.604	.282
I passive-aggressively ignore students in the hours or days after they misbehave	.143	-.161	.845
I am deliberately unfair to students in the hours or days after they misbehave	-.164	.230	.804
I hit, slam, or shove inanimate objects when students misbehave and the students see my response	.240	.046	.387
Eigenvalues	4.193	3.029	2.494
% of variance	40.558	10.954	10.044

Note. Factor loadings greater than .35 appear in bold (for loadings of practical significance, see Hair, Tatham, Anderson, & Black, 1998).

unequivocal and showed an inflexion that justified retaining the three components. Table 1 shows the factor pattern matrix. The items that cluster on the same items suggest that component 1 represents reactive aggression, component 2 instrumental aggression, and component 3 passive aggression. The instrument had good internal consistency ($\alpha = .86$).

Results

Descriptive statistics are summarized in Table 2. The teacher aggression scores are consistent with past research. For example, Mainhard *et al.* (2011) found student-reported teacher coercion to only be 1.27 on a Likert scale ranging from 1 (*not at all*) to 3 (*often*). Correlations are presented in Table 3. Zero-order correlations and partial correlations were weak to moderate, but all were significant and in the expected direction. All zero-order correlations and partial correlations were also highly similar, indicating that the covariates, gender, age, years teaching, and current role (primary, secondary) only had a marginal effect.

Testing I^3 theory

I^3 theory was tested by conducting a moderated moderation analysis using Hayes's (2013) PROCESS macro for SPSS version 22.0 (IBM Corp., Armonk, NY, USA). Gender (C_1), age (C_2), years teaching (C_3), and current role (C_4) were included as covariates. The assumptions of OLS regression were tested, including the independence of observations, outliers, normality, and homoscedasticity. Violations of normality were found whereby errors in the estimation of the outcome variable, teacher aggression (Y), conditioned on \hat{Y} , were not normally distributed. Both the Kolmogorov–Smirnov test, $D(249) = 0.119$, $p < .01$, and the Shapiro–Wilk test, $D(249) = 0.918$, $p < .01$, indicated that teacher aggression scores were significantly non-normal. Therefore, all of the OLS regression coefficients in this study were derived from 10,000 bias-corrected bootstrapped samples

Table 2. Descriptive statistics of study variables ($N = 249$)

	Mean	SD	Min.	Max.
Caregiving responsiveness	4.489	0.674	2.33	6.00
Misbehaviour provocation	2.990	1.045	1.33	5.83
Trait self-control	3.367	0.615	1.38	5.00
Teacher aggression	1.730	0.619	1.17	4.17

Table 3. Means, standard deviations, and zero-order (lower triangle) and partial correlations (upper triangle) among study variables

Measure	1	2	3	4
1. Caregiving responsiveness	–	–.239**	.268**	–.247**
2. Misbehaviour provocation	–.218*	–	–.227**	.371**
3. Trait self-control	.275**	–.210*	–	–.272**
4. Teacher aggression	–.264**	.355**	–.283**	–

Note. * $p < .005$.

** $p < .001$.

with replacement from the original sample. This additional step ensured that all of the estimated standard errors were robust (Hayes, 2013).

Furthermore, the focal predictor, caregiving responsiveness (X), and the primary and secondary moderators, misbehaviour provocation (M) and trait self-control (W), were mean-centred prior to analysis. This was performed to render the moderated regression coefficients more meaningful and substantively interpretable. Moderated moderation includes the products, XM , XW , MW , and XMW , which means that the effect of X on Y (b_1) is conditioned on M and W equalling zero, the effect of M on Y (b_2) is conditioned on X and W equalling zero, and the effect of W on Y (b_3) is conditioned on X and M equalling zero. However, the current data set did not include instances in which the focal predictor or moderators equalled zero, meaning that without mean-centring X , M , and W , the beta coefficients b_1 , b_2 , and b_3 would have been meaningless.

The moderated moderation analysis (three-way interaction term, $X'M'W'$) tested whether misbehaviour provocation (M') moderated the link between caregiving responsiveness (X') and teacher aggression (Y), and whether the effect of misbehaviour provocation itself was dependent on trait self-control (W'). Figure 3 illustrates the moderated moderation analysis model and the results are depicted in Table 4. The regression coefficient for the three-way interaction effect ($X'M'W'$) was not statistically significant, $b_7 = -0.003$, $t(237) = -0.036$, $p = .148$. This means that there was no evidence of a three-way interaction effect between caregiving responsiveness, misbehaviour provocation, and trait self-control when controlling for the covariates.

Testing the GAM

The GAM was tested by conducting a serial multiple mediation analysis with two mediators, again using Hayes' (2013) PROCESS macro for SPSS. Gender (C_1), age (C_2), years teaching (C_3), and current role (C_4) were included in the model as covariates. Caregiving responsiveness became the preliminary antecedent variable (X), and misbehaviour provocation (M_1) and trait self-control (M_2) became the first and second mediators, respectively (for a conceptual model, see Figure 4).

The direct effect (c')

In serial multiple mediation, the direct effect is the difference in Y between two cases that differ by one unit on X , independent of M_i and controlling for C_i . As can be seen in Table 5 and Figure 5, the direct effect of caregiving responsiveness on teacher aggression was statistically significant, $c' = -0.118$, $t(7,241) = -2.047$, $p < .05$. Therefore, two cases that differ by one unit on caregiving responsiveness are estimated to differ by -0.118 units on teacher aggression, independent of the mediators and controlling for the covariates, with those participants reporting lower caregiving responsiveness reporting higher teacher aggression (because c' was negative).

Furthermore, the effect of misbehaviour provocation on teacher aggression was statistically significant, $b_1 = 0.176$, $t(7,241) = 5.357$, $p < .001$. Therefore, two cases that differ by one unit on misbehaviour provocation are estimated to differ by 0.176 units on teacher aggression, independent of caregiving responsiveness and trait self-control, and controlling for the covariates, with those participants reporting higher misbehaviour provocation reporting higher teacher aggression (because b_1 is positive).

Finally, the effect of trait self-control on teacher aggression was statistically significant, $b_1 = -0.166$, $t(7,241) = -2.734$, $p < .01$. Therefore, two cases that differ by one unit on

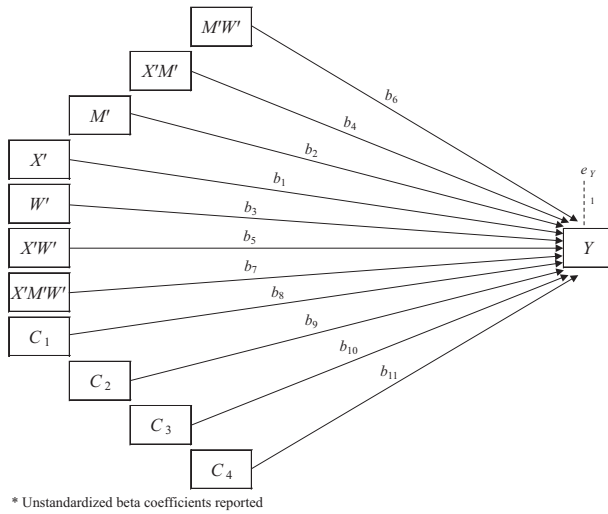


Figure 3. I³ theory moderated moderation model depicted as a statistical model.

trait self-control are estimated to differ by -0.166 units on teacher aggression, independent of caregiving responsiveness and misbehaviour provocation, and controlling for the covariates, with those participants reporting lower trait self-control reporting higher teacher aggression (because b_2 is negative).

The serial indirect effect ($a_1d_2b_2$)

A partial correlation was tested between M_1 and M_2 , controlling for X , to determine the association between the mediators remaining after accounting for the effect of X on both of them, $pr_{M_1M_2X} = -0.160$, $p < .05$. This suggested a serial pathway

Table 4. I³ theory regression analysis examining the moderation of teacher caregiving style on teacher aggression as a function of misbehaviour provocation and trait self-control

		b^a	SE	p
Intercept	i_1	1.841	0.113	.000
Caregiving responsiveness (X')	b_1	-0.128	0.062	.040
Misbehaviour provocation (M')	b_2	0.174	0.034	.000
Self-control (W')	b_3	-0.166	0.068	.015
$X'M'$	b_4	-0.055	0.051	.282
$X'W'$	b_5	0.002	0.105	.989
$M'W'$	b_6	0.019	0.056	.731
$X'M'W'$	b_7	0.003	0.074	.971
Gender (C_1)	b_8	-0.194	0.090	.032
Age (C_2)	b_9	0.021	0.031	.497
Years teaching (C_3)	b_{10}	-0.036	0.030	.231
Role (C_4)	b_{11}	0.124	0.079	.116

Note. $R^2 = .239$, $F(11,237) = 7.797$, $p < .001$.

^aUnstandardized beta coefficients.

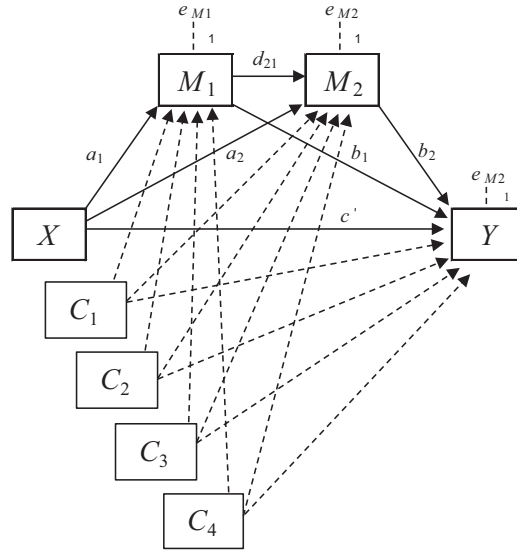


Figure 4. GAM serial multiple mediation model depicted as a statistical model.

because it showed that after controlling for the effect of caregiving responsiveness on both misbehaviour provocation and trait self-control, participants who reported higher misbehaviour provocation also were more likely to report lower trait self-control.

The serial indirect effect was the specific indirect effect of caregiving responsiveness on teacher aggression through misbehaviour provocation and trait self-control in serial, whereby caregiving responsiveness was associated with misbehaviour provocation, which in turn was associated with trait self-control, estimated as $a_1d_{21}b_2 = -0.372(-0.102)-0.166 = -0.066$. This specific indirect effect was significantly negative, 95% bootstrap confidence interval $[-0.018$ to $-0.002]$. Therefore, participants who reported lower caregiving responsiveness were more likely to report higher misbehaviour provocation (because a_1 was negative), lower trait self-control (because d_{21} was negative), and in turn higher teacher aggression (because b_2 was negative), controlling for the covariates. Stated differently, two cases that differed by one unit on caregiving responsiveness were estimated to differ by -0.066 units on teacher aggression, via misbehaviour provocation and trait self-control in serial, with those reporting lower caregiving responsiveness reporting higher teacher aggression (because $a_1d_{21}b_2$ was negative), controlling for the covariates.

Discussion

This study was conducted to better understand the circumstances in which teacher aggression occurs. It investigated whether the mechanism underlying teacher aggression follows the exceptional, catastrophic moderating process depicted in I^3 theory, or the more common, everyday mediating process depicted in the GAM. The results indicated that teacher aggression follows the GAM, suggesting that this dysfunctional behaviour is at least partly determined by the influence that caregiving responsiveness has on feelings of misbehaviour provocation and trait self-control. Therefore, teacher aggression may be

Table 5. GAM regression coefficients, standard errors, and summary information for the model in Figure 5

	Misbehaviour provocation (M_1)						Consequent					
	Misbehaviour provocation (M_1)			Self-control (M_2)			Self-control (M_2)			Aggression (Y)		
	b^a	SE	p	b^a	SE	p	b^a	SE	p	b^a	SE	p
Caring responsiveness (X)	a_1	-0.372	0.109	.001	a_2	0.209	0.064	.001	c'	-0.118	0.057	.042
Misbehaviour provocation (M_1)		-	-	-	$d_{2,1}$	-0.102	0.036	.005	b_1	0.176	0.033	.000
Self-control (M_2)		-	-	-		-	-	-	b_2	-0.166	0.061	.007
Gender (C_1)	f_1	0.339	0.152	.027	g_1	0.149	0.091	.105	h_1	-0.197	0.088	.027
Age (C_2)	f_2	0.111	0.050	.027	g_2	0.016	0.029	.586	h_2	0.023	0.030	.439
Years teaching (C_3)	f_3	-0.103	0.048	.033	g_3	0.001	0.029	.966	h_3	-0.038	0.030	.205
Role (C_4)	f_4	0.016	0.135	.905	g_4	0.033	0.080	.675	h_4	0.029	0.077	.096
Intercept	i_{M_1}	4.228	0.542	.000	i_{M_2}	2.533	0.327	.000	i_y	2.400	0.344	.000
		$R^2 = .082$				$R^2 = .113$				$R^2 = .235$		
		$F(5,243) = 4.078, p < .005$				$F(6,242) = 4.496, p < .001$				$F(7,241) = 12.039, p < .0001$		

Note. ^aUnstandardized beta coefficients.

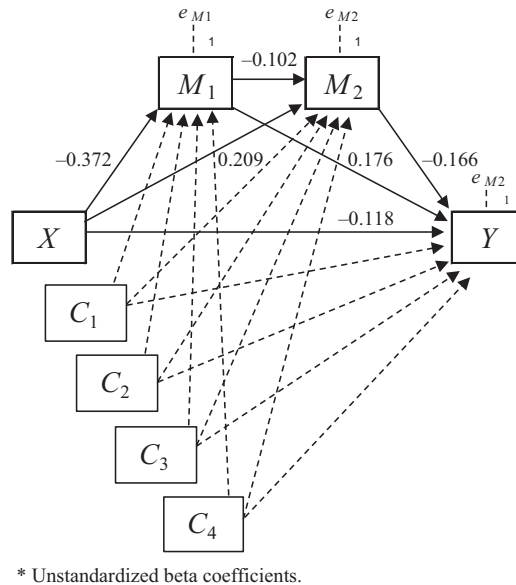


Figure 5. GAM statistical model from the serial multiple mediation analysis.

conceptualized as a person-in-situation process (Anderson & Bushman, 2002), whereby lower caregiving responsiveness indirectly leads to teacher aggression via two mediators, higher misbehaviour provocation and lower trait self-control in serial. This finding supports research indicating that teacher aggression is a relatively common teacher behaviour (Montuoro & Lewis, 2014), and not the exceptional ‘perfect storm situation’ predicted by I^3 theory (Finkel, 2014).

A lack of evidence for I^3 theory

The mechanism underlying teacher aggression does not appear to represent the spontaneous alignment of unrelated factors predicted by I^3 theory. There was no three-way interaction effect between the instigating trigger (misbehaviour provocation), the impelling force (caregiving responsiveness), and the inhibiting force (trait self-control), nor were there any two-way interaction effects between any of these variables.

Most studies testing I^3 theory have investigated events such as intimate partner violence (see Finkel *et al.*, 2012; Slotter *et al.*, 2012), with the metatheory failing to explain the mechanism underlying more common behaviours, such as counter-regulatory eating in dieters (Morton, 2014). Indeed, in spite of the relatively low means of self-reported teacher aggression found in this study and others (e.g., Mainhard *et al.*, 2011), recent student-reported research suggests that teacher aggression is rather common (for a review, see Montuoro & Lewis, 2014).

Support for the GAM

The mechanism underlying teacher aggression appears to follow the mediating process predicted by the GAM. The present study found a significant inverse relationship between

lower caregiving responsiveness and teacher aggression, independent of the mediators, misbehaviour provocation and trait self-control. This reflects earlier research demonstrating that insecurely attached caregivers display lower caregiving sensitivity and responsiveness, and higher anger towards dependent others (Rholes *et al.*, 1999; Simpson *et al.*, 2002).

There was also a direct relationship between higher misbehaviour provocation and teacher aggression, independent of the mediators. This is consistent with research which has repeatedly shown that frustration and provocation are associated with approach inclinations towards the perceived source of these feelings (for a review, see Harmon-Jones *et al.*, 2010).

Finally, there was an inverse relationship between lower trait self-control and teacher aggression, independent of the mediators. This replicates findings in the large body of research reporting that individuals with lower trait self-control display higher aggression (Denson *et al.*, 2012; DeWall, Finkel, & Denson, 2011; Finkel *et al.*, 2009; Gottfredson & Hirschi, 1990).

The present study also illustrated how the abovementioned factors interact with each other in a serial indirect pathway leading towards teacher aggression. Specifically, lower caregiving responsiveness led to higher misbehaviour provocation, which in turn led to lower trait self-control and, ultimately, higher teacher aggression. From the perspective of the GAM, this suggests that the mechanism underlying teacher aggression is based on, and proceeds from, lower caregiving responsiveness as a preliminary antecedent variable, which negatively influences the affective, cognitive, and arousal states through which the individual perceives and interprets student misbehaviour as a situational factor. This also suggests that the tendency to experience these internal states, in turn, negatively influences the appraisal and decision process by constraining trait self-control, leading to immediate appraisals and impulsive actions, instead of effortful reappraisals and thoughtful actions.

This finding is consistent with Bowlby's (1982, 1988) observation that lower caregiving sensitivity and responsiveness impair cognitive and emotional resources, which in turn leads to self-protective impulses. Of course, replication of the present study using qualitative, intra-individual data collected over several instances is needed to draw firmer conclusions regarding such processes (see limitations and future directions).

Teacher countertransference

Because the caregiving system functions unconsciously (Mikulincer & Shaver, 2007), the mechanism underlying teacher aggression may also be unconscious. This means that even though frustration and provocation are largely conscious experiences (Shaver, Schwartz, Kirson, & O'Connor, 1987), lower caregiving responsiveness may lower the activation threshold of negative affective schemas and aggressive response scripts without the individual noticing. A teacher with lower caregiving responsiveness may therefore be predisposed to experiencing higher misbehaviour provocation without knowing why. This is consistent with research demonstrating that teachers with an anxious attachment style are more likely than other teachers to experience feelings of anger towards students who misbehave (Riley, 2013).

Similarly, even though the exertion of trait self-control is a largely conscious process (Heatheron, 2011), the findings from the present study are consistent with previous research demonstrating that insecure attachment unconsciously inhibits trait self-control (Calkins & Leerkes, 2011). In fact, recent fMRI studies have shown that insecure

attachment leads to inefficient processing in prefrontal cortical regions during self-control tasks, including the lateral and medial orbitofrontal cortex, left dorsolateral prefrontal cortex, anterior cingulate cortex, and superior frontal gyrus (Moutsiana *et al.*, 2014; Warren *et al.*, 2010).

The results of the present study therefore indicate that teachers who respond aggressively to students who misbehave experience a form of countertransference. According to the moderate definition, countertransference has been used to describe mental health practitioners' (e.g., psychologists, psychoanalysts, psychotherapists) affective, cognitive, and behavioural reactions to clients, which are based on practitioners' unconscious biases, personal issues, and unresolved conflicts (Gelso & Hayes, 1998). Here, countertransference is triggered by clients redirecting emotions and attitudes from other relationships towards practitioners (i.e., transference), as well as client characteristics, and other aspects of the therapeutic relationship.

If the mechanism underlying teacher aggression follows the GAM, it is possible that this behaviour represents a kind of 'teacher countertransference'. Specifically, it is possible that teacher aggression is at least partially underpinned by attachment and caregiving styles, which in turn may unconsciously lead to higher misbehaviour provocation and lower trait self-control. It is interesting to note that Riley (2009, 2011, 2013) hypothesized that teachers with an insecure attachment unconsciously perceive student misbehaviour as a form of rejection, leading them to respond aggressively to these students. From this point of view, the results of the present study suggest that programmes that simply encourage proactive classroom management by imparting behavioural strategies (e.g., Lewis, Mitchell, Trussell, & Newcomer, 2014) are missing the importance of 'the person in the situation' in common aggressive behaviours (Anderson & Bushman, 2002, p. 34), and more specifically 'the *unconscious* person in the situation'. Like mental health practitioners, teachers may need to learn how to recognize, reflect on, and manage their own countertransferences (i.e., idiosyncratic interpretations of student behaviour) before they can implement classroom management strategies effectively (for a review of these issues in the psychotherapeutic literature, see Fauth, 2006).

Limitations

The main goal of the present study was to begin investigating the mechanism underlying teacher aggression. However, a deeper understanding of how participants experienced each variable, and how these variables causally interacted with each other, remains unknown. An important second step is to examine the experiences of teachers who respond aggressively to students who misbehave, especially those experiences that relate to the mechanism underlying teacher aggression identified here. This may be achieved by using a transcendental phenomenological approach (Davidson, 1994, 2002) to understanding these experiences more internally, as they are truly *lived*.

A second limitation was that the study was based on self-report measures. Self-report measures are problematic because they rely on participants providing honest and unbiased answers. Participants may not always provide answers that accurately describe themselves (Carducci, 2009). This limitation is worsened by questionnaires that focus on sensitive matters, such as teacher aggression. For example, discrepancies have been found between teacher and student perceptions of classroom management practices (Montuoro & Lewis, 2014). It is therefore possible that the participants in this study understated their feelings of misbehaviour provocation as well as their aggressive

behaviours. Studies applying observational or even psychological measures might help overcome this limitation.

Finally, the current sample was derived from a national database of existing research panel members who may regularly participate in online research. Although this data collection method is rather common and enabled access to a geographically diverse population, the participants' motivations and familiarity with online research may have led them to respond in different ways to a truly random sample of teachers. Furthermore, because the study was conducted online, the participants were not supervised. This may have led participants to adopt a relaxed attitude towards the research; on the other hand, it may have reduced effects of social desirability as well.

Conclusion

This study suggests that teacher aggression is more closely aligned with the GAM than I^3 theory. Teacher aggression appears to follow a mediating pathway that is initiated by lower caregiving responsiveness, which in turn leads to higher misbehaviour provocation and lower trait self-control. This indicates that the mechanism underlying teacher aggression is probably unknown to the teacher, an unconscious process that may represent a countertransference. If so, this signals the need for teacher education programmes to foster the self-development of the *whole person*, and to recognize that every teacher has a unique personal history that leads to unconscious biases, personal issues, and unresolved conflicts. Indeed, countertransference is considered a critical element of every therapeutic alliance (Gelso & Hayes, 2007), and may therefore also apply to the teacher-student relationship.

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Supporting Information

The following supporting information may be found in the online edition of the article:

Data S1. Manuscript highlights.

Appendix

Student Misbehaviour Provocation Questionnaire

Student misbehaviour includes any behaviour that you believe causes, or threatens to cause, a negative impact on the teaching and learning process, the well-being of others, or property. For each statement, write the number that indicates how descriptive the statement is of you.

1	2	3	4	5	6
Not at all descriptive of me					Very descriptive of me

- ___ 1. Student misbehaviour makes me feel frustrated.
- ___ 2. Student misbehaviour makes me feel upset.
- ___ 3. Student misbehaviour makes me feel angered.
- ___ 4. Student misbehaviour makes me feel distressed.
- ___ 5. Student misbehaviour makes me feel helpless.
- ___ 6. Student misbehaviour makes me feel threatened.